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Remarks

Thorough examination by the Examiner is noted and appreciated.

The claims have been amended and new claims added to further clarify Applicants invention and overcome Examiners interpretation of Applicants claim language.

No new matter has been added.

Support for the amended and new claims is found in the previously presented claims, the Figures (including Figures 1, 1A, and 2) and the Specification including at.

[0034] As indicated in step S2 of FIG. 2, the electrochemical plating (ECP) electrolyte bath solution 20 is prepared in the bath container 14. Next, as indicated in step S3, the organic composition mixture of the present invention is prepared and then suspended as a composition suspension layer 26 in the bath solution 20. The anode 16 and substrate 18 are then immersed in the bath solution 20 and connected to the adjustable current source 12 typically through wiring 38.

Claim Rejections under 35 USC 103

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1. Claims 1-2, 4-7 and 21-22 stand rejected under 35 USC Section 103(a) as being unpatentable over Miura et al. (USPUB 2003/0155247), in view of Willis (US 4,347,108) and Merriam-Webster's Collegiate Dictionary (1997, pp 1187-1188).

Miura et al. disclose an electrolyte solution for plating copper to fill vias and trenches on silicon wafers (see Abstract). The electrolyte solution of Miura et al. overcomes the problem of **dissolving a seed layer by an acid bath** by providing the electrolyte solution at a pH of from 4 to 10 and by providing a complexing agent (see paragraph 0014). Among several other types of complexing agents, Miura et al. teach that **oxycarboxylic and organic phosphonic acids in the form of salts** may be used (paragraph 0023, 0027, and 0029). Miura et al. teach that the complexing agent **serves the purpose of adjusting the pH of the electroplating solution**. Miura et al. teach that **any type of wetting agent may be added** to the electroplating solution including nonionic surfactants, anionic surfactants, cationic surfactants and amphoteric surfactants (paragraph 0043). Miura et al. teach that the electroplating solution adds to the thickness of the seed layer (paragraph 0051) **by not dissolving it**.

Thus, Miura et al. fail to disclose several aspects of

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Applicants disclosed and claimed invention.

Miura et al. does not teach a **non-ionic polymer**, but rather teaches complexing agents of **oxycarboxylic and organic phosphonic acids in the form of salts**, and does not disclose any particular **wetting agent**. Miura et al. teach that **any type of wetting agent** may be used including **nonionic surfactants**, anionic surfactants, cationic surfactants and amphoteric surfactants.

Thus, Miura et al. fails to teach a non-ionic polymer or a non-ionic polymer mixed with an organic acid or a **composition layer suspended within an electrolyte solution**.

Miura et al. does not disclose or suggest "**wherein said composition is disposed as a suspended layer within said electrolyte solution, said suspension layer of sufficient dimension to form a wetting layer on a substrate as said substrate is passed through said suspended layer.**"

Even assuming *arguendo*, a proper motivation for modifying Miura et al., based on the teachings of Willis, the further fact that Willis teaches **acidic copper electroplating baths** and that **one or more wetting agents may be incorporated into the plating bath preferably dissolved in water** (see paragraph 10, lines 3-24)

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including **polyoxyalkylated naphthols** (col 5, lines 39-45), **nonionic agents including ether linkages** (col 6, lines 9-16), or that amines, alkanols amines, amides, and non-ionic polyglycol-type wetting agents, such modification does not further help Examiner in producing Applicants invention or establishing a *prima facie* case of obviousness.

Examiner cites Merriam-Webster's Collegiate Dictionary for the definition of a "suspension" being "the state of a substance when its particles are mixed with but undissolved in a fluid or solid" and then proceeds to erroneously argue that "Miura disclose an electrolyte bath composition in a similar manner as instantly claimed. Thus, the suspension in Miura would have been the nonionic surfactant (page 3, paragraph 0043) mixed but undissolved in the organic acid (page 2, paragraph 0027) and electrolyte solution (page 3, paragraph, [0043] and [0044]".

While Applicants disagree that Miura disclose a suspension of non-ionic surfactant, and does not disclose a non-dissolved ionic surfactant mixed with an organic acid, what Examiner argues Miura discloses is not what Applicants have disclosed and claimed. Thus, Applicants have amended their claims to overcome Examiners interpretation of Applicants claims. The combination of references nowhere discloses or suggests:

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"wherein said composition is disposed as a suspended layer within said electrolyte solution, said suspended layer of sufficient dimension to form a wetting layer on a substrate as said substrate is passed through said suspended layer."

Examiner also argues that Applicants structural language is not entitled to support since it "is open to being read" as "a results achieved"; "how the physical arrangement was obtained does not distinguish the electrolyte bath from the prior art". Examiner cites no support for ignoring the clear structural language of "disposed" and arguing that the structural arrangement of a composition layer within Applicants electrolyte bath can be ignored, and is clearly mistaken that Applicants claims are product by process claims.

Examiner further states without citation "The Patent Office is not equipped to manufacture products put before and then obtain prior art products and make physical comparisons therewith".

Applicants respectfully reproduce the portion of the MPEP where such a statement is found:

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**THE USE OF 35 U.S.C. 102/103 REJECTIONS
FOR PRODUCT-BY-PROCESS CLAIMS HAS
BEEN APPROVED BY THE COURTS**

“[T]he lack of physical description in a product-by-process claim makes determination of the patentability of the claim more difficult, since **in spite of the fact that the claim may recite only process limitations**, it is the patentability of the product claimed and not of the recited process steps which must be established. We are therefore of the opinion that when the prior art discloses a product which reasonably **appears to be either identical with or only slightly different than a product claimed in a product-by-process claim**, a rejection based alternatively on either section 102 or section 103 of the statute is eminently fair and acceptable. As a practical matter, the Patent Office is not equipped to manufacture products by the myriad of processes put before it and then obtain prior art products and make physical comparisons therewith.” *In re Brown*, 459 F.2d 531, 535, 173 USPQ 685, 688 (CCPA 1972).

Thus, Examiner appears to be misreading the prior art of Miura et al. as a product by process as well as misreading Applicants claims (1 and 9) as product by process claims and reiterate that Applicants claims (1 and 9) are not product by process claims, as Examiner has erroneously asserted.

Nevertheless, Applicants have further amended their claims to even more clearly claim Applicants structural features of Applicants **suspended layer of a composition within an electrolyte bath.**

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Moreover, any attempt to modify Miura et al. to produce Applicants electrolyte bath, e.g., with the wetting agent of Willis (preferably dissolved in water) and the organic phosphonic acids in the form of salts (i.e., dissolved in water) of Miura et al. would not produce Applicants invention, and moreover any attempt to modify the dissolved electrolyte mixture of Miura et al. to produce Applicants invention including the disposition of a suspended layer of Applicants composition within the electrolyte solution, even if somehow possible when both the wetting agent of Willis and the organic acid of Miura et al. are dissolved in an aqueous electrolyte solution, would **change the principle of operation of the organic phosphonic acid salts of Miura et al. (of controlling the pH of the electrolyte solution i.e., dissolved in the electrolyte solution) and make them unsuitable for their intended purpose (of controlling the pH of the electrolyte solution).**

Thus, Miura et al. in combination with Willis et al. is insufficient to make out a *prima facie* case of obviousness as a **matter of law.**

"If the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references

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are not sufficient to render the claims *prima facie* obvious." *In re Ratti*, 270 F.2d 810, 123, USPQ 349 (CCPA 1959).

"If proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification." *In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984).

Finally, the combined references nowhere suggest or disclose the existence of Applicants suspended layer or its dimensions to accomplish the result claimed by Applicants:

"wherein said composition is disposed as a suspended layer within said electrolyte solution, **said suspended layer of sufficient dimension to form a wetting layer on a substrate as said substrate is passed through said suspended layer.**"

"**First**, there must be some **suggestion or motivation**, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. **Second**, there must be a **reasonable expectation of success**. **Finally**, the prior art

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reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success **must both be found in the prior art, and not based on applicant's disclosure.** *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

2. Claims 9, 12-13 and 23-24 stand rejected under 35 USC Section 103(a) as being unpatentable over Miura et al., above, in view of Willis, above, and Merriam-Webster's Collegiate Dictionary, above.

Applicants reiterate the comments made above with respect to Miura et al. Willis and Merriam-Webster's Collegiate Dictionary.

Applicants reiterate that nowhere do Miura et al. disclose the physical/structural arrangement of a composition within an electrolyte bath including "forming a suspended layer of said composition mixture within said electrolyte solution". Moreover, as noted above, any attempt to modify Miura et al. as modified by Willis to produce Applicants electrolyte bath including a suspended layer of a composition mixture would render the electrolyte of Miura et al. unsuitable for its intended purpose

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of controlling the pH of the electrolyte.

Thus, Miura et al. as modified by Willis et al. does not and could not produce Applicants invention, and is insufficient to make out a *prima facie* case of obviousness.

"If the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims *prima facie* obvious." *In re Ratti*, 270 F.2d 810, 123, USPQ 349 (CCPA 1959).

"If proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification." *In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984).

First, there must be some **suggestion or motivation**, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. **Second**, there must be a **reasonable expectation of success**. **Finally**, the prior art reference (or references when combined) **must teach or suggest all**

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the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success **must both be found in the prior art, and not based on applicant's disclosure."** *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

Examiners arguments directed toward claimed concentrations of Applicants suspended layer (composition), as being optimizable ranges obtainable by routine experimentation is misplaced since, Examiner has not shown several elements of Applicants invention, or any suggestion thereof in the prior art, **including a recognition of achieving a recognized result including the step of forming Applicants suspended layer within an electrolyte bath.**

"A particular parameter must first be recognized as a result-effective variable, i.e., a variable which achieves a recognized result, before the determination of the optimum or workable ranges of said variable might be characterized as routine experimentation." *In re Antonie*, 559 F.2d 618, 195 USPQ 6 (CCPA 1977).

3. Claims 17-20 and 25-28 stand rejected under 35 USC Section 103(a) as being unpatentable over Miura et al., above, in view of Willis, above, and Merriam-Webster's Collegiate Dictionary,

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above.

Applicants reiterate the comments made above with respect to Miura et al. Willis and Merriam-Webster's Collegiate Dictionary.

Applicants reiterate that nowhere do Miura et al. in combination with Willis disclose or suggest Applicants method including those elements in **bold** type:

"A method for electroplating a metal onto a surface in an electroplating electrolyte solution, comprising the steps of:

providing a composition mixture comprising **an organic acid and a non-ionic polymer;**

forming a suspended layer of said composition mixture within said electrolyte solution;

forming a wetting layer on said surface by passing said surface through said suspended layer and into said electrolyte solution; and

electroplating said metal onto said surface following

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forming said wetting layer."

Finally, the combined references nowhere suggest or disclose **Applicants method** of forming a wetting layer on a substrate and then electroplating a metal onto the substrate suspended layer or its dimensions to accomplish the result claimed by Applicants:

"wherein said composition is disposed as a suspended layer within said electrolyte solution, **said suspended layer of sufficient dimension to form a wetting layer on a substrate as Applicants claim.**"

"**First**, there must be some **suggestion or motivation**, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. **Second**, there must be a **reasonable expectation of success**. **Finally**, the prior art reference (or references when combined) **must teach or suggest all the claim limitations**. The teaching or suggestion to make the claimed combination and the reasonable expectation of success **must both be found in the prior art, and not based on applicant's disclosure.**" *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

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Examiners arguments directed toward claimed concentrations of Applicants suspended layer (composition), as being optimizable ranges obtainable by routine experimentation is misplaced since, Examiner has not shown several elements of Applicants invention, or any suggestion thereof in the prior art, **including a recognition of achieving a recognized result including the step of forming Applicants suspended layer within an electrolyte bath.**

"A particular parameter must first be recognized as a result-effective variable, i.e., a variable which achieves a recognized result, before the determination of the optimum or workable ranges of said variable might be characterized as routine experimentation." *In re Antonie*, 559 F.2d 618, 195 USPQ 6 (CCPA 1977).

Examiners Arguments

Examiners arguments have been addressed in the body of the rejection to the extent they are still applicable in view of Examiners erroneous interpretation of Applicants claim language including "suspension layer", which language has now been amended to overcome Examiners interpretation.

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Conclusion

The cited references, singly or in combination fail to produce or suggest Applicants invention, and therefore fail to make out a *prima facie* case of obviousness.

Applicants have amended their claims to further clarify Applicants claim language to overcome Examiners interpretation of Applicants claim language.

Applicants respectfully request reconsideration of their claims and submit that Applicants Claims are now in condition for allowance. Such favorable action by the Examiner at an early date is respectfully solicited.

In the event that the present invention as claimed is not in a condition for allowance for any other reasons, the Examiner is respectfully invited to call the Applicants' representative at his Bloomfield Hills, Michigan office at (248) 540-4040 such that necessary action may be taken to place the application in a condition for allowance.

Respectfully submitted,

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